CITY OF DAYTON (PWS 6210004)
SOURCE WATER ASSESSMENT FINAL REPORT

November 27, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and/or springs and aquifer characteristics.

This report, *Source Water Assessment for City of Dayton in Franklin County, Idaho*, describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The City of Dayton (PWS #6210004) drinking water system consists of three springs and two wells. The springs (Spring #1, Spring #2, and Spring #3) are located in the Five-Mile Creek drainage northwest of Dayton. The wells (Well #1 and Well #2) are located within the City of Dayton. The springs are the system's main source of drinking water. Diversion channels direct each spring's water to a collection area where it is gravity fed to the storage reservoirs located on a small hill west of the city. The two wells act as backup sources for the system and pump water directly to the storage reservoirs. The system supplies an average of 417,600 gallons of water per day to approximately 440 persons, through 156 metered connections.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with mostly urban and heavy agricultural areas, the best score a water source can get is moderate. Potential contaminants are divided into four categories, inorganic chemical (IOC, i.e. nitrates, arsenic) contaminants, volatile organic chemical (VOC, i.e. petroleum products) contaminants, synthetic organic chemical (SOC, i.e. pesticides) contaminants, and microbial contaminants (i.e. total coliform or E. coli bacteria). As different water sources can be subject to various contamination settings, separate scores are given for each type of contaminant.

The potential contaminant sources within the delineated capture zones for the wells and springs include an underground storage tank (UST), a leaking underground storage tank (LUST), a Group 1 site (sites that show elevated levels of contaminants and are not within the priority areas), and a county landfill. Additionally, Five-Mile Creek, small streams, and two transportation corridors (County Route D1 and the railroad) cross the delineations. If an accidental spill occurred from any of these corridors, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer system. Other potential contaminant sources identified within the delineated area that may contribute to the overall vulnerability of the water were septic tanks within the City of Dayton, wildlife and domestic animal grazing, and numerous livestock and dairy operations. A complete list of potential contaminant sources is provided with this assessment (see Table 1, Table 2, and Table 3).

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS) and the State Drinking Water Information System (SDWIS). No SOCs or VOCs have ever been identified in the springs or wells. The IOCs fluoride and nitrate have been detected in the drinking water. Despite existing in a nitrate priority area, nitrate levels are below the maximum contaminant level (MCL) as set by the EPA. The nitrate history (between the years of 1983 and 2001) shows concentrations for Well #1 range from 3.49 milligrams per liter (mg/L) to 5.49 mg/L with the peak concentration in November 1997. The nitrates found in Well #2 range from 0.89 mg/L to 1.32 mg/L. Nitrate results from the springs range from 0.31 mg/L to 0.85 mg/L. Radionuclides, such as gross alpha and gross beta, have been detected in the water for Well #1, below the designated MCL for each chemical. An evaluation of the system's bacteria history (between 1996 and 2002) detected total coliform and E. coli at various locations within the distribution system, and in two springs (Spring #2 and Spring #3). The spring sources were under construction, or the samples were untreated when bacteria was detected. When bacteria was identified in May 2000, a boil order was required until bacteria was no longer present in the system. During 2002, bacteria was absent in the system. Although arsenic has not been detected in any of the drinking water sources, the system should recognize that in October 2001, the EPA lowered the arsenic MCL to 0.01 milligrams per liter (mg/L), giving systems until 2006 to comply with the new standard.

The Idaho Department of Environmental Quality (DEQ) in 2001 conducted a Sanitary Survey for the City of Dayton. Some system improvements for the wells were to install 24-mesh screen over the opening of the pump to waste discharge pipes. Also, both wells need to disconnect the pump discharge lines that connect to the well casings and install blind flanges. For the springs, the required Microscopic Particulate Analysis (MPA) tests need to be performed to determine whether the sources are classified as Ground Water Under Direct Influence (GWUDI) of surface water. The City of Dayton plans to conduct the MPA tests for the spring sources during 2002. Addressing the improvements outlined in the sanitary survey may prolong the life of the water sources and reduce the chance of contaminants entering the drinking water system.

In terms of total susceptibility, the springs rated as low susceptibility for IOCs, VOCs, and SOCs. Spring #1 rated low for microbial contamination, whereas Spring #2 and Spring #3 automatically rated high for microbial contamination due to microbial detects in May 2000. Well #1 and Well #2 rated highly susceptible for IOCs, VOCs, SOCs, and microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Dayton, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). There should be no application or storage of herbicides, pesticides, or other chemicals within 50 feet of a public water system wells and within 100 feet of springs. An additional protective measure would be to limit the use of roads that pass within 50 feet of a drinking water source. The system should continue their efforts to keep the distribution system free of microbial contamination. Any new sources that could be considered potential contaminants that reside within a water source's zones of contribution should be investigated and monitored to evaluate the threat the contaminant may pose in the future. Land uses within most of the source water assessment area are outside the direct jurisdiction of the City of Dayton. Therefore partnerships with federal, state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating city employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, and the Caribou County Soil and Water Conversation District. As major transportation corridors that intersect the delineation (such as the County Route D1, and the railroad), the Idaho Department of Transportation should be involved in protection efforts. If the system should need to expand in the future, new well or spring sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF DAYTON, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Level of Accuracy and Purpose of the Assessment

The DEQ is required by the EPA to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The drinking water protection program should be determined by the local community and be based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Dayton (PWS #6210004) drinking water system consists of three springs and two wells. The springs (Spring #1, Spring #2, and Spring #3) are located in the Five-Mile Creek drainage northwest of Dayton (see Figure 1). The wells (Well #1 and Well #2) are located within the City of Dayton. The springs are the system's main source of drinking water. Diversion channels direct each spring's water to a collection area where it is gravity fed to the storage reservoirs located on a small hill west of the city. The two wells act as backup sources for the system and pump water directly to the storage reservoirs. The system supplies an average of 417,600 gallons of water per day to approximately 440 persons, through 156 metered connections.

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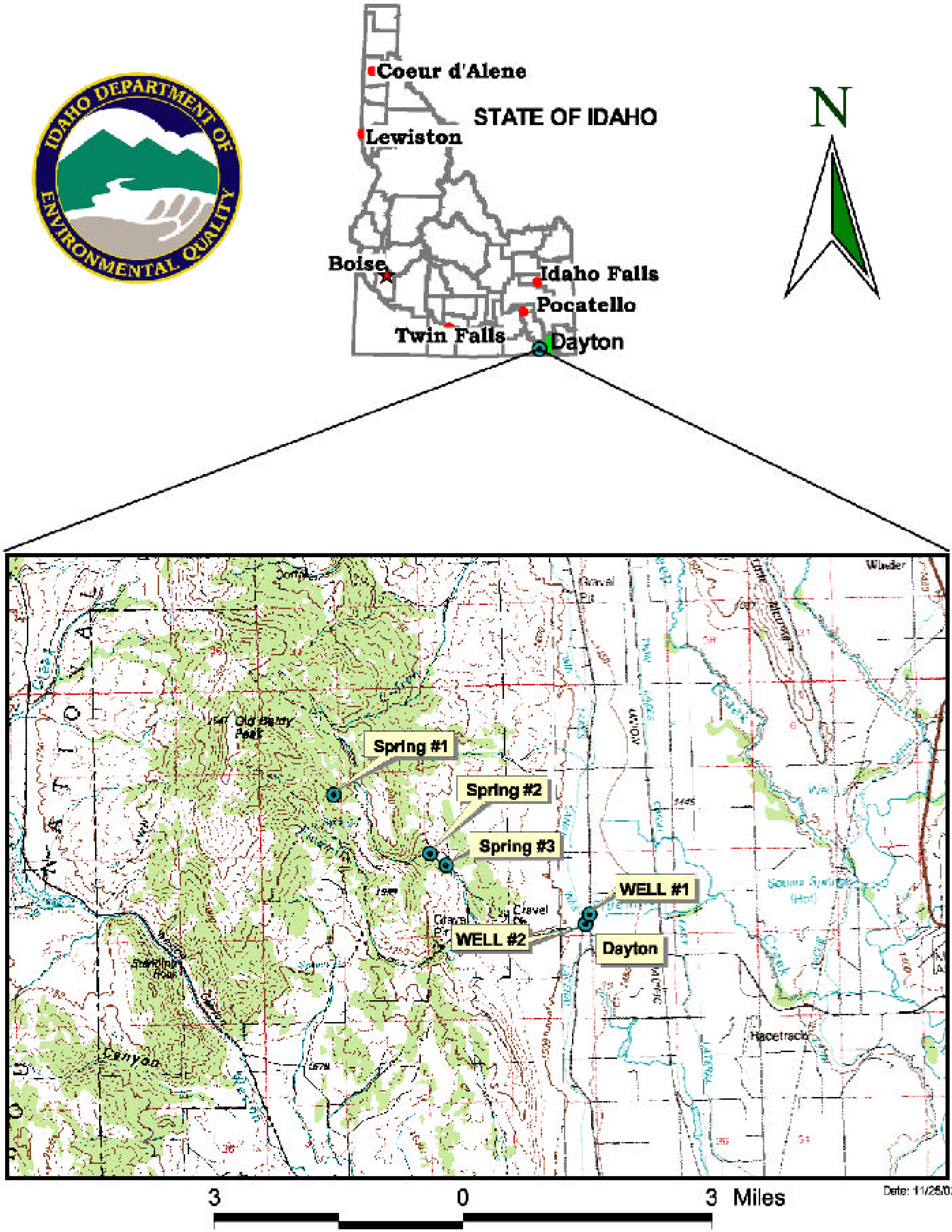
Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of- travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International, Inc (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a conceptual computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Cache Valley hydrologic province in the vicinity of the City of Dayton. The computer model used site specific data, assimilated by WGI from a variety of sources including operator records, well logs (when available) and hydrogeologic reports. A summary of the hydrogeologic information from the WGI is provided below.

FIGURE 1 - Geographic Location of the City of Dayton, PWS: 6210004



Hydrogeologic Conceptual Model

The Bear River originates in the Uinta Mountains of northern Utah and winds its way through over 500 miles of Wyoming, Idaho, and Utah to terminate in a freshwater bay of the Great Salt Lake just 90 miles west of its source (Dion, 1969, p. 6). The Bear River enters Idaho near Border, Wyoming and flows along the north edge of the Bear River Plateau. Flowing north through the Bear River – Dingle Swamp hydrologic province, it passes into the Soda Springs hydrologic province east of the Bear River Range. Upon entering the Gem Valley – Gentile Valley hydrologic province, it swings south. Now west of the Bear River Range, the river passes through the Oneida Narrows into the Cache Valley hydrologic province. Over most of its course through Idaho, the Bear River is gaining and in direct hydraulic communication with the major aquifer systems of the four hydrologic provinces. The exception is a small reach between the cities of Alexander and Grace where it is generally losing and is perched over the regional fractured basalt aquifer (Dion, 1969, p. 30).

Ground water in the Bear River Basin is found in Holocene alluvium, Pleistocene basalt, and rocks of the "Pliocene (?)" [sic] Salt Lake Formation, pre-Tertiary undifferentiated bedrock, and possibly the "Eocene (?)" [sic] Wasatch Formation (Dion, 1969, pp. 15 and 16). Rocks of the Salt Lake Formation, which include freshwater limestone, tuffaceous sandstone, rhyolite tuff and poorly-consolidated conglomerate, outcrop along the major valley margins and may underlie the valley-fill alluvium (Dion, 1969, pp. 16 and 17). Many of the wells drilled into this formation do not yield water. The few wells that do produce water yield as much as 1,800 gallons per minute (gpm) from beds of sandstone and conglomerate.

The Wasatch Formation is restricted to the Bear Lake Plateau and small areas northwest of Bear Lake (Dion, 1969, p. 17). The formation is composed largely of tightly cemented conglomerate and sandstone with smaller amounts of shale, limestone, and tuff. The primary pore space is typically impermeable. Water movement may occur through joints and fractures or more permeable zones that are thought to exist along the relatively flat-lying formation (Dion, 1969, p. 17). Springs occur at the margins of the formation.

Precipitation in the basin ranges from 10 inches per year on the floor of Bear Lake Valley to over 45 inches per year on the Bear River Range (Dion, 1969, pp. VII and 11). Applied over the entire basin, precipitation amounts to approximately 2.3 million acre-feet annually. Precipitation is also the principal source of recharge to the basin's aquifers in conjunction with spring snowmelt and runoff, irrigation seepage, and canal losses.

Natural ground water discharge is by flow to the Bear River, springs, seeps along riverbanks, and evapotranspiration in large marshy areas (Dion, 1969, p. VIII). Some discharge may also occur by way of underflow to the Portneuf River drainage through basalt flows at Tenmile pass and near Soda Point.
Ground water is obtained from both springs and wells in the Bear River Basin. Hundreds of springs issue primarily from fractures and solution openings in the bedrock on the margins of the basin (Dion, 1969, p. 47). Water production from wells in the four hydrologic provinces is primarily from alluvial and basalt aquifers; however, some wells tap conglomerate, sandstone, limestone and shale aquifers of the Salt Lake and possibly the Wasatch formations (Dion, 1969, p. VII).

Cache Valley

Cache Valley is a complex graben covering about 310 square miles in southeastern Idaho and 350 square miles in northeastern Utah. It was once a bay of ancient Lake Bonneville resulting in lake terraces along the margins of the valley (Dion, 1969, p. 7). The related topographic features and deposits of ancient lakes affect the occurrence and movement of ground water (Bjorklund and McGreevy, 1971, p. 14).

The valley floor consists of unconsolidated valley-fill sediments of Quaternary age from the former Lake Bonneville and older lakes and streams, as well as younger alluvium. The sediments consist of silts and gravel of the Alpine and Bonneville formations, overlain by interfingering beds of gravel, sand, silt, and clay. Alluvial fan and landslide deposits are exposed along the margins of the valley. There is a general coarsening of sediments from lower elevations in the center of the valley to the higher elevations at the valley margins (Johnson et al., 1996). The surrounding mountain ranges consist of highly faulted Tertiary Salt Lake and "Wasatch (?)" [sic] formation rocks and Permian through Precambrian rocks (Bjorklund and McGreevy, 1971, Plate 1).

The major aquifers are composed of sand and gravel in fans and deltas; interbedded layers of lake-bottom clays and silts confine the aquifers and cause artesian conditions throughout the valley (Bjorklund and McGreevy, 1971, p.14). Deltas and fans from streams entering the valley generally contain a high percentage of gravel and are considered good aquifers (Bjorklund and McGreevy, 1971, p.15). The exception is the Bear River delta, which is composed mostly of fine sand and silt and contains poor aquifers.

Aquifer recharge occurs mainly by infiltration of water from precipitation, streams, canals, ditches, and irrigated lands and by subsurface inflow. A large volume of recharge originates in the Bear River Range where 30 to 50 inches of precipitation fall in most years. Average annual precipitation on the valley floor is approximately 15.5 inches (Bjorklund and McGreevy, 1971, pp. 5 and 18). The principal recharge area is along the margins of the valley that are underlain by permeable unconsolidated materials (Bjorklund and McGreevy, 1971, p. 18). In the lower parts of the valley, some water is recharged to shallow unconfined aquifers, but infiltrated water does not reach the confined aquifers in Idaho because of the upward artesian gradient.

Ground water is discharged by springs, seeps, drains, evapotranspiration, and wells. Many streams in Cache Valley originate at springs and seeps within the valley, and other streams gain in flow as they traverse the valley floor. Potentiometric levels range in elevation from about 4,850 feet above mean sea level (msl) near Oxford to about 4,500 feet msl near the Idaho-Utah border. Generally, the ground water flow direction is locally toward the Bear River and regionally south toward Utah. The Bear River in the Idaho part of Cache Valley is gaining (Bjorklund and McGreevy, 1971, p.19).

Artesian conditions exist in a large part of the lower valley. Heads of most flowing wells are less than 40 feet above land surface, but heads as high as 62 feet above land surface have been measured (Bjorklund and McGreevy, 1971, p. 22). Water table conditions exist near the edge of the valley beneath alluvial slopes and benchlands. The depth to water is as much as 300 feet below ground surface (bgs) along the margin of the upper valley.

Most wells in the valley produce water from the unconsolidated basin deposits. Driller's logs indicate that the alluvium may contain several aquifers separated by silt and clay (Dion, 1969, p. 19). The most productive aquifer systems in the Idaho part of Cache Valley are in the area of Weston Creek and in fan deposits along the north and west sides of the valley. Aquifer tests near Weston indicate an average transmissivity of about 30,000 ft^2/day (Bjorklund and McGreevy, 1971, p. 2). Transmissivity values of 5,000 and 40,000 ft^2/day were reported from two tests conducted north of Clifton, Idaho (Johnson et al., 1996, p. 21). For a computer-aided analysis of the resulting test data, the contact at the valley margin was conceptualized as a low-permeability boundary and simulated as a no-flow boundary (Johnson et al., 1996, p .11). All of the Cache Valley PWS wells modeled are located within a couple of miles of the bedrock/valley-fill contact or other near-surface geologic contact.

Capture Zone Modeling Method

The Cache Valley hydrologic province well delineations were performed using the calculated fixed-radius method. Method selection was based on an assessment of hydrogeologic uncertainty as affected by the quantity and quality of available information. Relevant information included well completion data, proximity of the well to the bedrock/valley-fill contact and/or faults, and knowledge of ground water flow direction based on water table contour maps (Bjorklund and McGreevy, 1971, Plates 1 and 4, and Kariya et al., 1994, Plate 2). The calculated fixed-radius method was used to delineate capture zones for the City of Dayton wells completed in sedimentary rock aquifers within the Cache Valley hydrologic province. The fixed radii for the 3-, 6-, and 10-year time of travel capture zones were calculated using equations presented by Keely and Tsang (1983) for the velocity distribution surrounding a pumping well.

These wells are completed or assumed completed in either unconsolidated alluvium or conglomerate based on well location and completion depths. The hydraulic conductivity for alluvial wells (112 ft/day) is the geometric mean of pump test-derived estimates presented by Bjorklund and McGreevy (1971, Table 5). The effective porosities (0.3 and 0.2) and uniform hydraulic gradients (0.01 and 0.003) are the default values presented in Table F-3 of the Idaho Wellhead Protection Plan for unconsolidated alluvium and mixed volcanic and sedimentary rocks, primarily sedimentary rocks, respectively (IDEQ, 1997, p. F-6). The aquifer thickness is the saturated open interval of each well. For wells lacking these data, the aquifer thickness was assigned a value based on other PWS wells completed in the same aquifer. The hydraulic gradients used in the fixed-radius calculations are the default values presented in Table F-3 of the Idaho Wellhead Protection Plan for unconsolidated alluvium and mixed volcanic and sedimentary rocks, primarily sedimentary rocks (IDEQ, 1997, p. F-6).

To maintain conservatism in the delineation of capture zones for the City of Dayton, the pumping rate for Well #2 is half the average PWS water usage of 140,000 gallons per day (gpd) because the springs are the primary PWS water source and produce a minimum of 50 percent of the water supply. Well #1 was treated as a backup well and pumped at the same rate as Well #2. The average pumping rates for the remaining wells either are reported values (i.e., the owner/operator response to the PWS questionnaire or the State of Idaho Public Water Supply Inventory Forms) or were estimated using the Cache Valley per capita water consumption rate of 279 gpd.

Delineation of the source water protection area for the springs involved special consideration. Hydrogeologic setting is foremost among the factors that control the shape and extent of the capture zone. A spring resulting from the presence of a high permeability fracture extending to great depth will have a much different capture zone than a depression spring formed where the ground surface intersects the water table in a unconsolidated aquifer. The latter can be reasonably modeled as either a well or an internal constant head boundary. In many cases, however, the methods commonly used to delineate protection areas for water-supply wells are not applicable (Jensen et al., 1997). Application of the refined method using WhAEM (Kraemer et al., 2000), for instance, may not be appropriate for a fracture or tubular spring produced from an aquifer that displays a high degree of heterogeneity and anisotropy. Techniques that are most applicable to the springs within the scope of this report are the topographic, refined, and calculated fixed-radius methods. Hydrogeologic mapping techniques have been useful in characterizing the hydrogeologic setting and the zone of contribution to springs (Jensen et al., 1997, pp. 6-7). Other techniques such as tracer and isotope studies, potentiometric surface mapping, geochemical characterization, and geophysical survey interpretation require data that are not available without additional fieldwork.

The topographic method was used to delineate capture zones for the City of Dayton springs. The topographic method was chosen for springs that 1) are located within relatively small drainage basins with easily definable divides, 2) have an average annual discharge that can be reasonably supplied by an average annual precipitation in the drainage, and 3) have characteristics of a shallow system such as seasonal variations in discharge and temperature.

The delineated source water assessment area for Well #1 can best be described as three concentric circles 750 feet, 1,100 feet, and 1,600 feet in diameter for the 0-3 year, 3-6 year, and 6-10 year time of travel zones, respectfully (see Figure 2). For Well #2, the delineation is three concentric circles 0.8 miles, 1.6 miles, and 2.6 miles in diameter for the 0-3 year, 3-6 year, and 6-10 year time of travel zones, respectfully (see Figure 3). The delineations for the springs were based upon the watershed or drainage basin that feeds water into the spring sources (see Figure 4 and Figure 5). The actual data used by WGI to determine the areas delineated for the source water assessments is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineation areas.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in March and May of 2002. The first phase involved identifying and documenting potential contaminant sources within the City of Dayton source water assessment areas through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas. This task was undertaken with the assistance of Mr. Tarrel Shepherd with the City of Dayton water system. At the time of the enhanced inventory, additional potential contaminant sources were found within the delineated source water area. The potential contaminant sources within the delineated capture zones for the wells include an underground storage tank, a leaking underground storage tank, a Group 1 site (sites that show elevated levels of contaminants and are not within the priority areas), and a county landfill. Additionally, Five-Mile Creek, small streams, and two transportation corridors (County Route D1 and the railroad) cross the delineations. If an accidental spill occurred from any of these corridors, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer system. Other potential contaminant sources identified within the delineated area that may contribute to the overall vulnerability of the water were septic tanks within the City of Dayton, wildlife and domestic animal grazing (springs only), and numerous livestock and dairy operations. A complete list of potential contaminant sources is provided with this assessment (see Table 1, Table 2, and Table 3). Potential contaminant sources are given unique site numbers that references tabular information associated with the public water wells. Maps with well and spring locations, delineated areas and potential contaminant sources are provided with this report (see Figure 2 - Figure 5).

Table 1. City of Dayton, Well #1, Potential Contaminant Inventory

Site #	Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
1	Dayton Septic Tanks	0-3	Enhanced Search	IOC, Microbials
	Highway - County Route D1	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Five-Mile Creek	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Highway - County Route D1 and Five-Mile Creek	3-6; 6-10	GIS Map	IOC, VOC, SOC

[1] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Dayton, Well #2, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Dairy, <=200 cows	0-3	Database Search	IOC, Microbials
2	Feed lot	0-3	Enhanced Inventory	IOC, Microbials
3	Dayton Septic Tanks	0-3	Enhanced Inventory	IOC, Microbials
	Five-Mile Creek	0–3	GIS Map	IOC, VOC, SOC, Microbials
	Twin Lakes Canal	0–3	GIS Map	IOC, VOC, SOC, Microbials
	Highway – County Route D1	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Railroad	0–3	GIS Map	IOC, VOC, SOC, Microbials
4	Dairy, <=200 cows	3-6	Database Search	IOC
5	Dairy, <=200 cows	3-6	Database Search	IOC
6	Dairy, <=200 cows	3-6	Database Search	IOC
7	Feed Lot/Former Dairy	3-6	Enhanced Inventory	IOC
8	Feed Lot	3-6	Enhanced Inventory	IOC
9, 10	LUST site, UST site, site cleanup completed, impact unknown	6-10	Database Search	VOC, SOC
11	Dairy, <=200 cows	6-10	Database Search	IOC
12	Dairy, 1001-2000 cows	6-10	Database Search	IOC
13	Group 1 Site – Nitrate	6-10	Database Search	
14	Municipal Landfill – Active	6-10	Database Search	IOC, VOC, SOC
15	Feed Lots	6-10	Enhanced Inventory	IOC
16	Former Dairy	6-10	Enhanced Inventory	IOC
	Five-Mile Creek	3-6; 6–10	GIS Map	IOC, VOC, SOC
	Twin Lakes Canal	3-6; 6–10	GIS Map	IOC, VOC, SOC
	Highway – County Route D1 Railroad	3-6; 6–10 3-6; 6–10	GIS Map GIS Map	IOC, VOC, SOC IOC, VOC, SOC

[1] UST = Underground Storage Tank, LUST = Leaking Underground Storage Tank
Group 1 Site = Sites that show elevated levels of contaminants and are not within the priority one areas
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 3. City of Dayton's Springs Contaminant Inventory

Site #	Source Description	TOT Zone[1] (years)	Source of Information	Potential Contaminants[2]
	Small stream upgradient from spring sources	Watershed Delineation	GIS Map	IOC, VOC, SOC, Microbial
	Wildlife and Domestic Animal Grazing Influence	Watershed Delineation	GIS Map	IOC, VOC, SOC, Microbial
	4WD trails (Spring #2 and #3 only)	Watershed Delineation	GIS Map	IOC, VOC, SOC, Microbial

[1] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

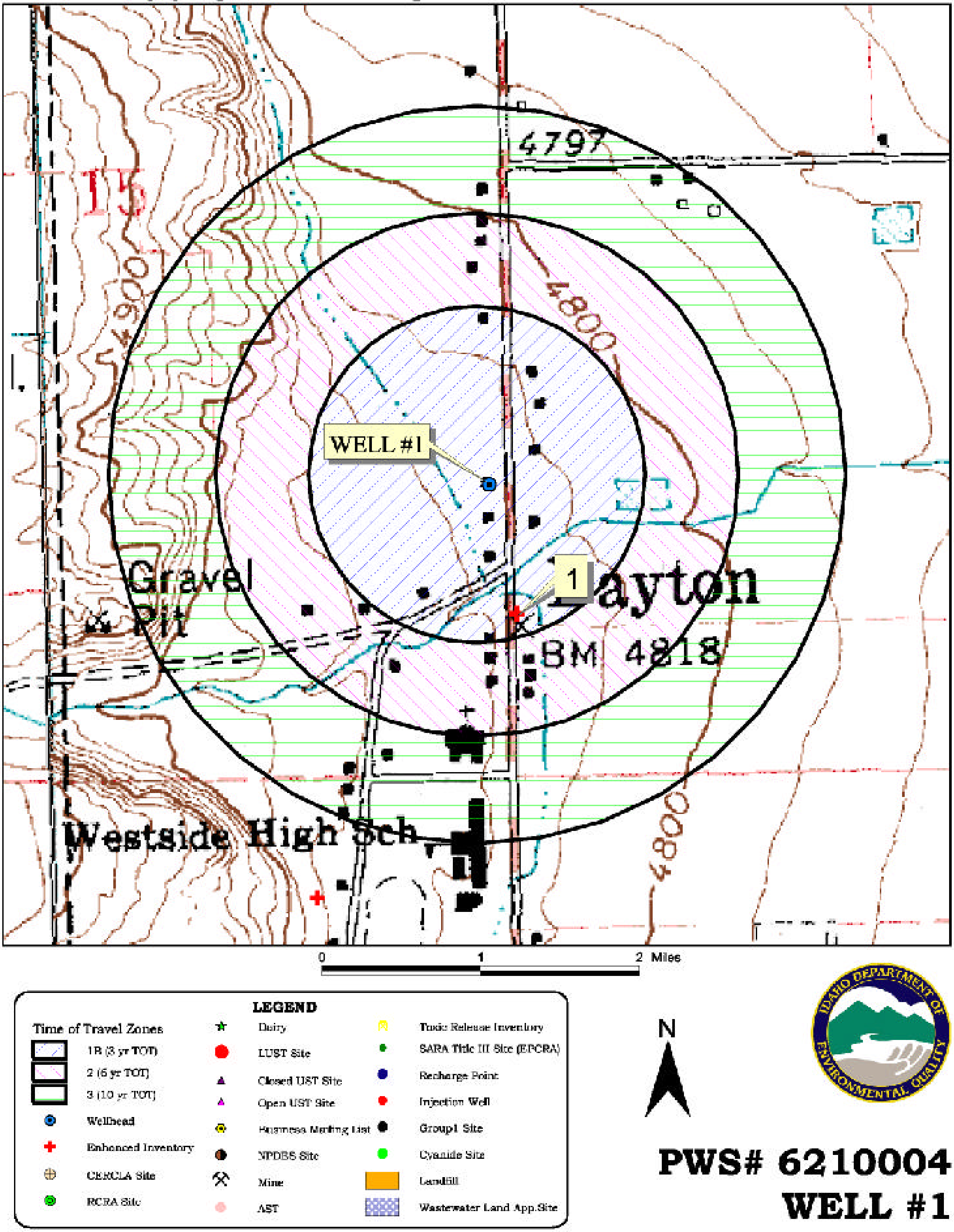
Each well's susceptibility to contamination were ranked as high, moderate, or low susceptibility according to the following considerations: hydrologic characteristics, physical integrity of the wells, land use characteristics, and potentially significant contaminant sources. The susceptibility of springs are ranked as high, moderate, or low susceptibility by evaluating spring construction, whether the infiltration gallery is under the direct influence of surface water, the type of land use, including farm chemical usage and agricultural land percentages, and to incorporate all potentially significant contaminant sources within the delineated area. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Well Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Well #1 and Well #2 rated high for hydrologic sensitivity. Scores were increased because area soils are moderate to well-drained (as defined by the National Resource Conservation Service (NRCS)), the depth to first water is less than 300 feet (unknown for Well #1 and 68 feet in Well #2), and an aquitard is not present. The vadose zone composition is unknown for Well #1, and is predominantly gravel in Well #2. Whether a 50-foot thick fine-grained zone is present in the subsurface for Well #1 is unknown. The well log for Well #2 shows clay and gravel above the first water-bearing unit, but the thickness is less than 50-feet. A 50-foot thick fine-grained zone above the perforated zones of the well can provide additional protection by reducing the downward movement of contaminants. No well log was available for Well #1 during this analysis, and scores regarding the missing information defaulted to the most conservative rating.

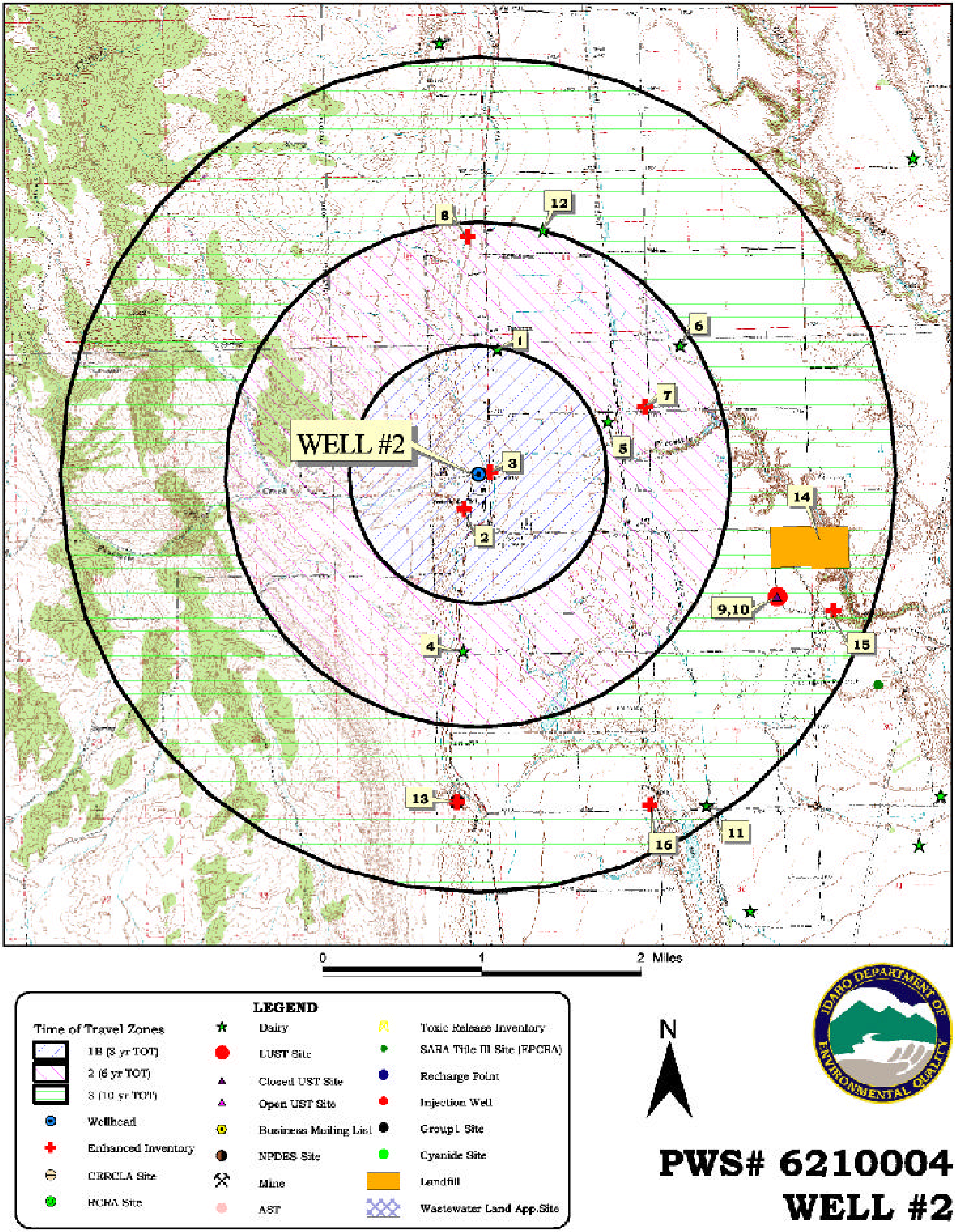
FIGURE 2. City of Dayton Delineation Map and Potential Contaminant Source Locations



PWS# 6210004

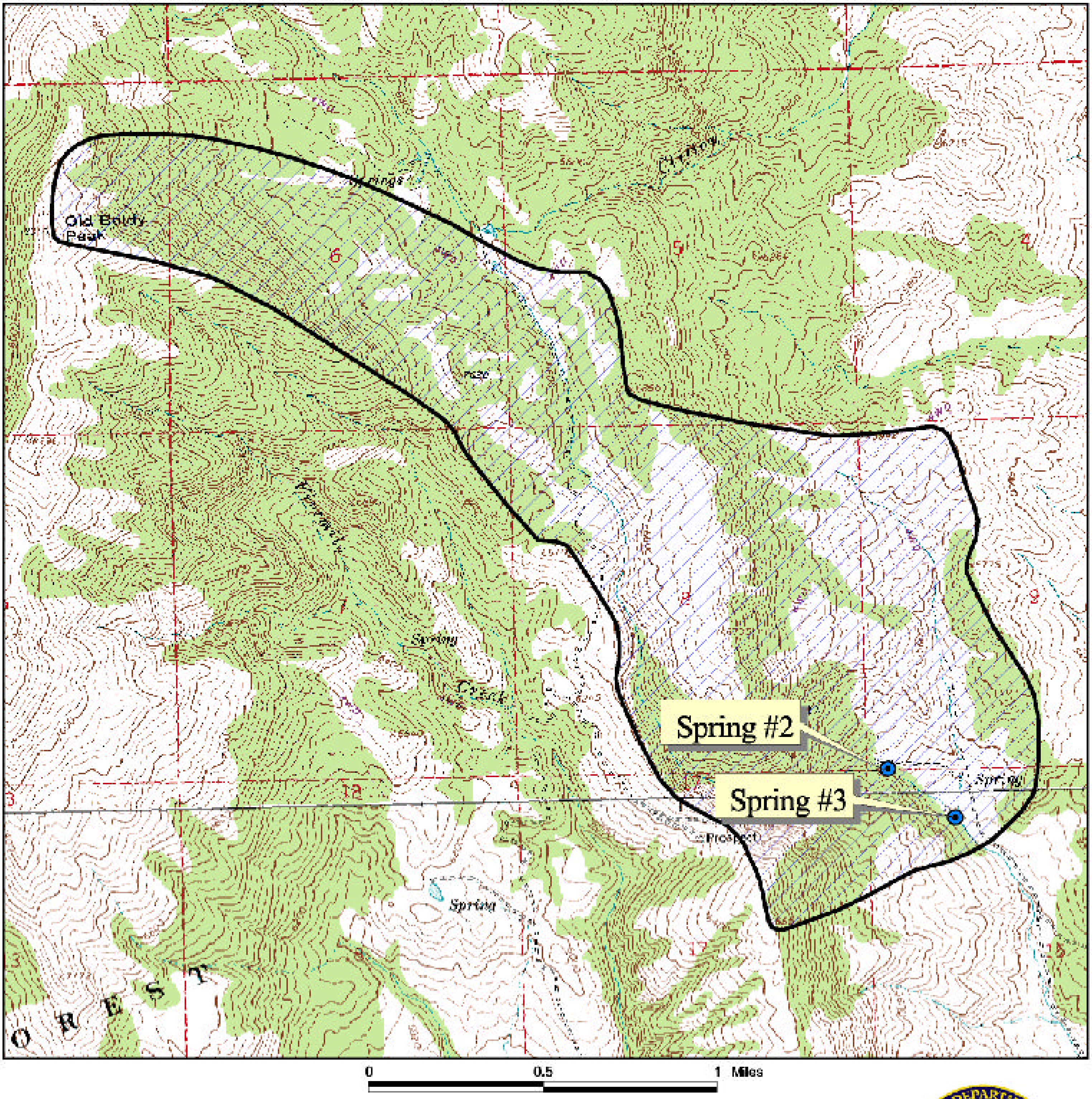
WELL #1

FIGURE 3. City of Dayton Delineation Map and Potential Contaminant Source Locations



PWS# 6210004
WELL #2

FIGURE 4. City of Dayton Delineation Map and Potential Contaminant Source Locations

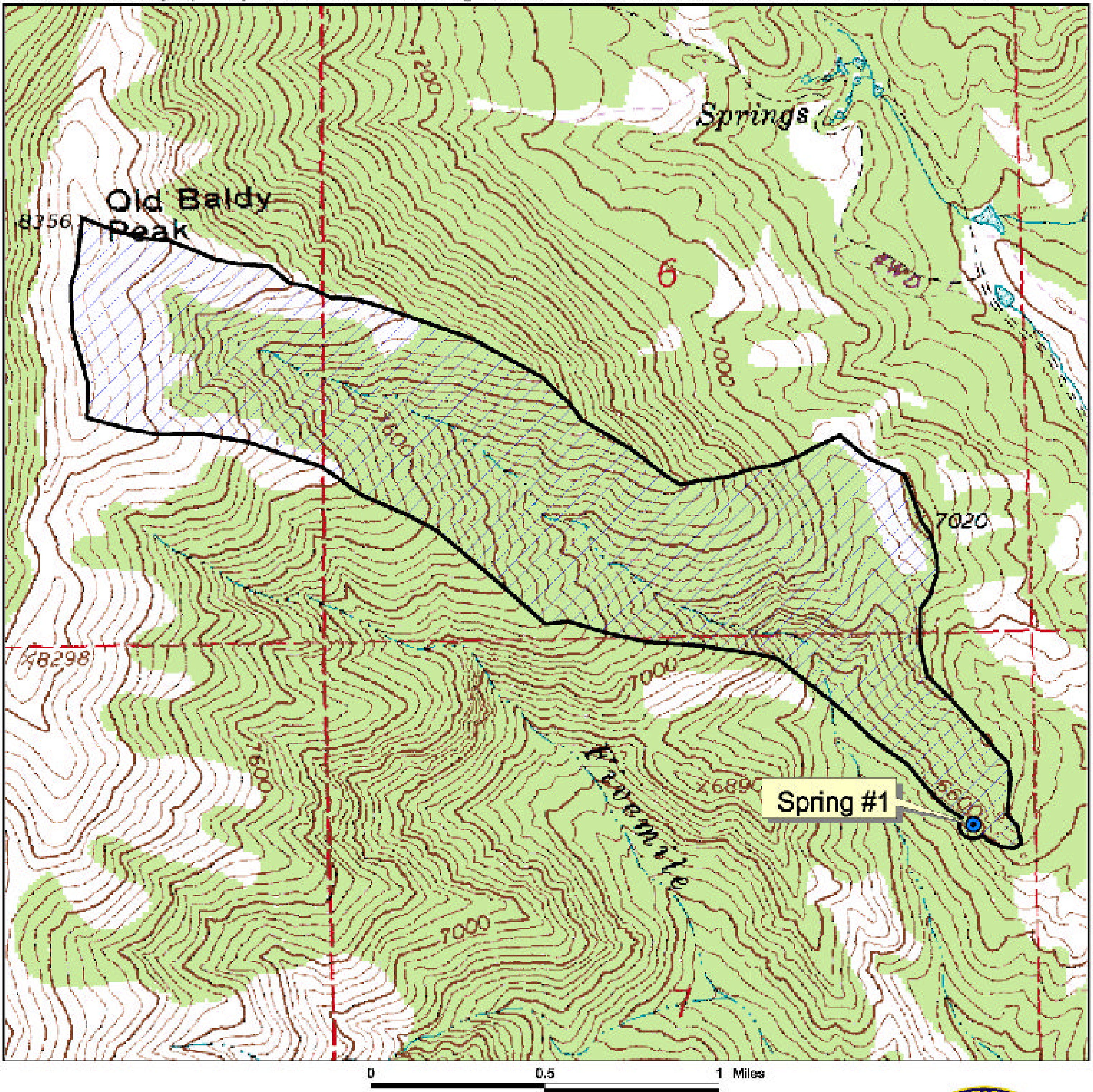


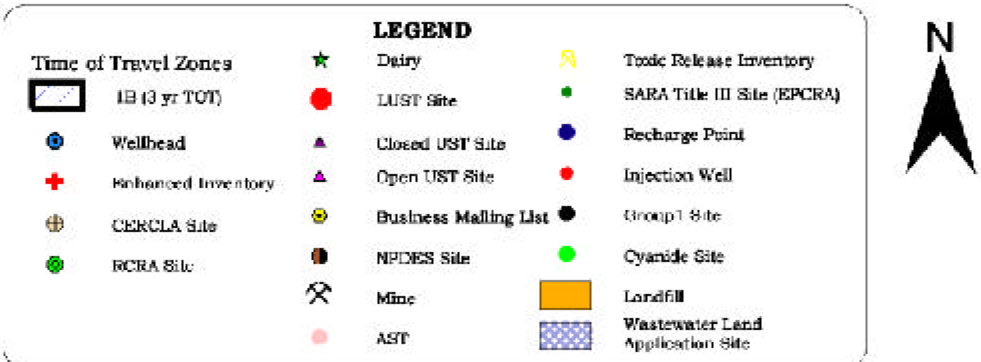
LEGEND

Time of Travel Zones
1B (3 yr TOT)
Wellhead
Enhanced Inventory
CERCLA Site
RCRA Site
Dairy
LUST Site
Closed UST Site
Open UST Site
Business Mailing List
NPDES Site
Mine
AST
Toxic Release Inventory
SARA Title III Site (EPCRA)
Recharge Point
Injection Well
Group1 Site
Cyanide Site
Landfill
Wastewater Land Application Site

PWS# 6210004
SPRING #2 &
SPRING #3

FIGURE 5. City of Dayton Delineation Map and Potential Contaminant Source Locations





PWS# 6210004
SPRING #1

System Construction

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capabilities. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Well #1 (Tag # E0007233) was rated moderate for system construction. Well #1 is used as the backup water source for Well #2. The drill date for Well #1 is unknown. Well #1 was completed to a depth of 260 feet and cased with a 12-inch-diameter steel pipe (DEQ Sanitary Survey, 2001). Current regulations require that a 12-inch diameter well casing have a thickness of 0.375-inches. The static water level is approximately 55 feet bgs. The screened or perforated interval of the well casing is unknown. The well uses a submersible pump that is set to approximately 250 feet bgs. The wellhead and surface seal are maintained and in acceptable condition. The wellhead is not located within a 100-year floodplain. It is unknown if the casing and annular seal extend into units of low permeability (such as clay), whether the highest water production level was more than 100 feet below the static water level, or if a well test was conducted. If well log information is made available, the susceptibility scores for Well #1 may change because proper well construction and well location are important when evaluating the susceptibility of drinking water sources to contamination.

Well #2 (Tag # E0007234) rated moderate for system construction. Well #2 was constructed in 1994 to a depth of 370 feet into clay material. The static water level is 68 feet bgs. The well was cased with a 14-inch-diameter steel pipe to 350 feet bgs. Current regulations require that a 14-inch diameter well casing have a thickness of 0.375-inches. The pipe is perforated between 64 and 123, 168 and 172, 297 and 305, and 342 and 348 feet bgs. A submersible pump is set at 320 feet bgs. According to the 2000 sanitary survey, the wellhead and sanitary seal are maintained and in good condition. The wellhead is not in the 100-year floodplain. The well casing extends into clay, however, the score increased because the annular seal is not seated into a unit of low permeability. The highest water production zone was less than 100 feet below the static water level, there was no well test data, and the wellhead does not have a screened vent. If the highest production interval is more than 100 feet below the water table, the source is considered to have better buffering capabilities from contaminants. Also, placing a 24-mesh screen over the well vent can prevent animals and insects from accessing the well column.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm) a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In this case, there was insufficient information available to determine if Well #1 met all the criteria outlined in the IDWR Well Construction Standards. Well #2 did not meet the criteria outlined in the IDWR Well Construction Standards.

Spring Construction

Spring construction directly affects the ability of the intake to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the spring's water. Lower scores imply a system is less vulnerable to contamination. For example, if the intake structure of the surface water system is properly located and constructed to minimize impacts from potential contaminant sources, then the possibility of contamination is reduced and the system construction score goes down. If the system was constructed in a way that the infiltration gallery is separated from any surface water so as to provide some kind of natural filtration, the water quality is more protected and the system score is reduced.

Spring #2 and Spring #3 rated low for system construction, whereas the Spring #1 rated moderate. The U.S. Forest Service owns the land where the springs are located. The area surrounding all three springs is fenced to restrict access to the sources.

The Spring #2 (Tag # E0007236) and Spring #3 (Tag # E0007235) were rebuilt in 1982 and 1981 respectively, and have been bermed to divert surface water from the collection areas. Both the collection areas and collection lines are kept free of brush and debris. Water from the springs does not contact the atmosphere, prior to distribution. The water is collected into perforated pipes set in diversion terraces downgradient of the springs and transported by PVC pipes to a junction box and ultimately to the storage reservoirs.

The Spring #1 (Tag # E0007237) was developed by the Works Progress Administration (WPA) in the 1930's. This spring was developed to prevent contact the atmosphere prior to distribution (communication, 2002). According to the 2001 sanitary survey, construction details of the collection pipes are unknown.

Potential Contaminant Source and Land Use

Well #1 rated high for IOCs (i.e. nitrates, arsenic), moderate for VOCs (i.e. petroleum products) and SOCs (i.e. pesticides), and low for microbial contaminants (i.e. bacteria). Well #2 rated high for IOCs, VOCs, SOCs, and moderate for microbial contaminants. All three springs rated low for IOCs, VOCs, SOCs, and microbials.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed detection of total coliform bacteria or fecal coliform bacteria at the wellhead or spring will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead or 100 feet of a spring will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Susceptibility Summary

No SOCs or VOCs have ever been found in the wells. Radiation and the IOCs fluoride and nitrate have been detected in tested water. Despite existing in a nitrate priority area, nitrate has been detected once above the action level (Well #1 at 5.49 mg/L in November 1997) which is half of the MCL (10.0 mg/L). Bacteria were detected in the distribution system and in two of the springs.

In terms of total susceptibility, both Well #1 and Well #2 rated high for IOCs, VOCs, SOCs, and microbial contaminants (see Table 3). The total susceptibility for all three springs rated low for IOCs, VOCs, and SOCs. Microbial contaminants rated low for Spring #1, and automatically high for Spring #2 and Spring #3. The automatically high ratings were due to total coliform bacteria detections at the spring sources in May 2000 (see Table 4).

Table 4. Summary of the City of Dayton Well Susceptibility Evaluation

Drinking Water Sources	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	H	M	M	L	M	H	H	H	H
Well #2	H	H	H	H	M	M	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = Inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 5. Summary of City of Dayton Spring Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores[1]								
	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
	IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Spring #1	L	L	L	L	M	L	L	L	L
Spring #2	L	L	L	L	L	L	L	L	H*
Spring #3	L	L	L	L	L	L	L	L	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility
IOC = Inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H*= Automatically rated high due to detections of total coliform in spring source

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the City of Dayton, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the wells. Land uses within most of the source water assessment area are outside the direct jurisdiction of the City of Dayton, making collaboration and partnerships with federal, state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, Caribou Soil and Water Conservation District, and the NRCS.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office	(208) 236-6160
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (mharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

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Attachment A

City of Dayton
Susceptibility Analysis
Worksheets

Susceptibility Analysis Formulas

Formula for Well Sources
The final well scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:
0 - 5 Low Susceptibility
6 - 12 Moderate Susceptibility
≥ 13 High Susceptibility

Formula for Spring Sources
The final spring scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC/Microbial Final Score = (Potential Contaminant/Land Use X 0.273) + System Construction

Final Susceptibility Scoring:
0 - 7 Low Susceptibility
8 - 15 Moderate Susceptibility
≥ 16 High Susceptibility

1. System Construction

		SCORE
Drill Date	Unknown	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2001
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	3	2	2	3
(Score = # Sources X 2) 8 Points Maximum		6	4	4	6
Sources of Class II or III leacheable contaminants or	YES	7	2	2	
4 Points Maximum		4	2	2	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Non-Irrigated Agricultural	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	8	8	8

Potential Contaminant / Land Use - ZONE II

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Non-Irrigated Agricultural	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0

Potential Contaminant / Land Use - ZONE III

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0

Cumulative Potential Contaminant / Land Use Score	23	17	17	10
4. Final Susceptibility Source Score	15	13	13	14
5. Final Well Ranking	High	High	High	High

1. System Construction		SCORE
Drill Date	10/5/94	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2001
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	7	4	4	7
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	11	4	4	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		18	16	16	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0

Cumulative Potential Contaminant / Land Use Score	28	26	26	14
4. Final Susceptibility Source Score	16	15	15	15
5. Final Well Ranking	High	High	High	High

1. System Construction

		SCORE
Intake structure properly constructed	YES	0
Is the water first collected from an underground source? Yes = spring developed with casing to collect water from beneath the ground No = water collected after water contacts atmosphere, or unknown	YES	0
Total System Construction Score		0

2. Potential Contaminant Source / Land Use

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	3	3	3
(Score = # Sources X 2) 8 Points Maximum		6	6	6	6
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	6	6
Cumulative Potential Contaminant / Land Use Score		6X0.273=2	6X0.273=2	6X0.273=2	6X0.273=2

3. Final Susceptibility Source Score

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	2	2	2	2
4. Final Source Ranking	Low	Low	Low	High

Spring Water Susceptibility Report — Public Water System Name : DAYTON CITY OF — Spring# : SPRING #2

Public Water System Number 6210004 — 11/25/02 2:13 PM

1. System Construction

		SCORE
Intake structure properly constructed	YES	0
Is the water first collected from an underground source? Yes = spring developed with casing to collect water from beneath the ground No = water collected after water contacts atmosphere, or unknown	YES	0
Total System Construction Score		0

2. Potential Contaminant Source / Land Use

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	3	3	3
(Score = # Sources X 2) 8 Points Maximum		6	6	6	6
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	6	6
Cumulative Potential Contaminant / Land Use Score		6X0.273=2	6X0.273=2	6X0.273=2	6X0.273=2

3. Final Susceptibility Source Score

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	2	2	2	2
4. Final Source Ranking	Low	Low	Low	High

Spring Water Susceptibility Report   Public Water System Name : DAYTON CITY OF   Spring# : SPRING #1
Public Water System Number 6210004   11/25/02 2:14 PM

1. System Construction

		SCORE
Intake structure properly constructed	NO	1
Is the water first collected from an underground source? Yes = spring developed with casing to collect water from beneath the ground No = water collected after water contacts atmosphere, or unknown	YES	0
Total System Construction Score		1

2. Potential Contaminant Source / Land Use

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	1	1	1	1
(Score = # Sources X 2) 8 Points Maximum		2	2	2	2
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		2	2	2	2
Cumulative Potential Contaminant / Land Use Score		2X0.273=1	2X0.273=1	2X0.273=1	2X0.273=1

	IOC	VOC	SOC	Microbial
3. Final Susceptibility Source Score	2	2	2	2
4. Final Source Ranking	Low	Low	Low	Low